

18  
-17-

ART 31 Amdt

Claims

1. Water-soluble, biologically degradable and aminoplast former-free copolymers based on polyamide, characterized in that they contain at least one grafted side chain composed of aldehydes and sulfur-containing acids or salts thereof.
2. Copolymers as claimed in claim 1, characterized in that they contain the polyamide component in proportions of 5 to 80 % by weight and preferably of 10 to 60 % by weight, the aldehyde component in proportions of 5 to 90 % by weight and preferably of 10 to 70 % by weight and the sulfur-containing acidic component in proportions of 5 to 60 % by weight and preferably of 15 to 40 % by weight.
3. Copolymers as claimed in one of the claims 1 or 2, characterized in that they have as the polyamide component natural polyamides, particularly preferably caseins, gelatins, collagens, bone glues, blood albumins, soya proteins and degradation products thereof formed by oxidation, hydrolysis or depolymerization, synthetic polyamides, particularly preferably polyaspartic acids or copolymers of aspartic and glutamic acid and degradation products thereof formed by oxidation, hydrolysis or depolymerization as well as mixtures thereof.
4. Copolymers as claimed in one of the claims 1 to 3, characterized in that they contain grafted aldehydes based on paraformaldehyde, paraldehyde and/or unbranched non-aromatic aldehydes preferably with 1 to 5 C atoms and particularly preferably formaldehyde, acetaldehyde and glyoxal.

5. Copolymers as claimed in one of the claims 1 to 4, characterized in that they contain grafted sulfur-containing acids (salts) based on inorganic sulfur salts, preferably sulfites, hydrogen sulfites and/or disulfites of alkali (alkaline) metals, of aluminium, iron and/or ammonium.
6. Copolymers as claimed in one of the claims 1 to 5, characterized in that the side chain is additionally composed of at least one compound from the series ketones and aromatic alcohols.
7. Copolymers as claimed in claim 6, characterized in that the additional compound(s) is/are present in proportions of 5 to 85 % by weight and preferably of 10 to 70 % by weight.
8. Copolymers as claimed in one of the claims 6 to 7, characterized in that they have grafted ketones based on non-aromatic ketones and particularly preferably 2-propanone, 2-butanone or pyruvic acid.
9. Copolymers as claimed in one of the claims 6 to 8, characterized in that they contain grafted aromatic alcohols based on phenols, cresols, catechols or resorcins.
10. Copolymers as claimed in one of the claims 1 to 9, characterized in that they were produced by graft polymerization at temperatures between -10 and 250°C and in particular between 0 and 130°C in each case preferably in the presence of a solvent and in particular in the presence of a polar solvent such as water or dimethylsulfoxide or by thermal treatment.

11. Use of water-soluble, biologically degradable copolymers based on polyamide which contain at least one grafted side chain composed of aldehydes and sulfur-containing acids or salts thereof as flow agents for inorganic binders and pigments and particularly preferably for hydraulic binders.
12. Use as claimed in claim 11, characterized in that the copolymers have a molar mass  $\overline{M}_n$  of  $< 50,000$  g/mol.
13. Use of water-soluble, biologically degradable copolymers based on polyamide which contain at least one grafted side chain composed of aldehydes and sulfur-containing acids or salts thereof as water retention agents.
14. Use as claimed in claim 13, characterized in that the copolymers have a molar mass  $\overline{M}_n$  of  $> 50,000$  g/mol.
15. Use as claimed in one of the claims 11 to 14, characterized in that side chain is additionally composed of at least one compound from the series ketones, aromatic alcohols and aminoplast formers.
16. Use as claimed in claim 15, characterized in that it contains the additional compound(s) in proportions of 5 to 85 % by weight and preferably of 10 to 70 % by weight.
17. Use as claimed in one of the claims 15 or 16, characterized in that the copolymers as aminoplast formers contain dicyandiamide, urea derivatives and/or amino-s-triazines.

18. Use as claimed in one of the claims 15 or 16, characterized in that the copolymers have grafted ketones based on non-aromatic ketones and particularly preferably 2-propanone, 2-butanone or pyruvic acid.
19. Use as claimed in one of the claims 15 or 16, characterized in that the copolymers contain grafted aromatic alcohols based on phenols, cresols, catechols or resorcins.
20. Use as claimed in one of the claims 15 to 19, characterized in that the copolymers contain grafted amino-s-triazines based on melamine (derivatives) and particularly preferably melamine.
21. Use of the copolymers as claimed in one of the claims 11 to 20 in combination with modified and/or unmodified polysaccharides.
22. Use as claimed in claim 21, characterized in that modified celluloses and particularly preferably hydroxyalkylcelluloses in which alkyl = C<sub>1-4</sub> are used as polysaccharides.